Interpersonal aspects of design

- The criteria rely on social and affective (attitudinal and emotional) consequences.
  - Examples: workplace design, places where we live.
- The objective
  - is to illustrate some of issues pertinent to built environments, and some relevant research findings.

The built environment effects

- The varied features of the built environment can have profound effects on people:
  - The effects of the physical features of such environments
    - Social features
    - Cultural
    - Technological
    - Economic
    - An political factors characteristic of the environment.
  - The built environment with nonphysical features affects:
    - Performance in work and other aspects of life
    - Social behavior / Attitudes
    - Satisfaction / Dissatisfaction
    - Mental health
    - Quality of life
    - Physical health and well being.

Evaluating the built environment

- How to assess the affective response of people to various aspects of the built environment:
  - Field studies (Survey)
  - Laboratory methodology
    - Subjects drawings, pictures, or scale models of built environments (e.g. a living room, a office)
    - Ask people to rate it along various dimensions (e.g. friendliness, warmth, complexity, etc).
    - Features of the environment are varied in order to assess.
      - E.g. Placement of windows, ceiling height, or color of walls, etc.

References

- Sanders (1993), Ch. 15.
Good design?

• Good design should be directed toward satisfying several goals/ criteria simultaneously.
• However, it is not feasible to fulfill all the desired objectives with a single design.
• Various design objectives are not equal and tend to form a hierarchy (Bennett, 1977).
  – Example:
    • In planning a private home, considering factors as location, convenience to transportation, types of neighbors, size and number of rooms, and cost.
    • The relative values the individual places on these and other features would place the values in some rough hierarchy.
    • Low in the hierarchy usually would be dropped or modified.

Social behavior in offices

• Factors of office plan design that impacts interpersonal behavior
  – Type of office plan:
    • The degree to which a company permits “personalization” of the workplace.
    • Personalization refers to the deliberate adornment, decoration, modification, or rearrangement of an environment (Sommer, 1974).
    • Personalization is tolerated more in closed-plan offices than in open-plan.
      – Because the entire space is visible in open-plan offices, planners want the office to look the way they designed it to look and consider personalization as spoiling the aesthetic environment (Dundon, 1982).
    • Personalization for job satisfaction is circumstantial.
      • People regard personalization as important and feel that the company recognizes ‘individual’ identity.
      – “status markers” (Louis Harris and Associate, 1978).
    • Status markers are those aspects of design that differentiate people of different rank in an organization.
    • Status markers in a closed-plan office is common.

Disturbances and distractions

• Disturbances and distractions in offices
  – Open-plan offices contribute to an increased number of distractions and disturbances (Sommer, 1979).
    • See results in Sanders, Table 15-5, p.
  – Disturbances tended to be higher in the “action” landscaped office vs. open-plan offices than in the traditional area.
  – Work-related distractions were higher in the open-plan office than in other two.
  – Complain about distractions and distractions are common in open-plan (Dundon & Grandjean, 1977).
    • Only in the immediate surrounding areas disturbance in concentration.
  – “siliency” problems of occupants who are unable to concentrate.
    • Getting the work done is related to concentrate without noise or other distractions (Steelcase, 1978).

Designing open-plan offices

• Health in office environments
  – Headaches were twice as prevalent among open-plan office employees as among traditional plan office employees.
  – Eye irritation, coughs, colds, and sore throats.
  – Related to air conditioned offices, not the type of offices.
• Designing open-plan offices
  – The layout should be based on actual communication patterns and work group needs.
  – Survey should be conducted to assess;
    • who talks to whom,
    • who works with whom,
    • what type of interactions take place, privacy needs,
    • and what facilities are needed by each person to do the work.
• Design recommendation to enhance the utility of an open-plan office (Wichman, 1984)
  – Use sound absorbing materials on all major surfaces.
  – Leave some elements of design for the workstation user.
  – Provide both vertical and horizontal surfaces for the display of personal belongings.
  – Install telephones that ring “silently”.
  – Provide all private work areas with a system to signal the willingness of the occupant to be disturbed.
  – Provide several easily accessible islands of privacy.
  – Have clearly marked flow paths for visitors.
  – Design workstations so it is easy for drop-in visitors to sit down.
  – Plan for ventilation air flow.
  – Need storage space.

Designing landscaped offices

• Investigation of the landscaped offices
  – landscaped offices (Brookes, 1972; Brookes & Kaplan, 1972; McCarrey et al., 1974)
    • Complain of noise
    • Visual bustle
    • Lack of privacy and confidentiality of communications
    • Lack of “territory definition”
      – Most people react favorably to the aesthetic aspects of such offices.
      – It looks better but it works worse (Brookes, 1972).
      – It increased productivity (McCarrey et al, 1974).
      – Landscaped offices would be preferred over large, open, pull pen types.
Windows or No windows?

- Psychological need for some contact with the outside world (Manning, 1965).
- The use of deep buildings, where only the outer ring of offices has windows, and underground work places have further focused attention on the psychological value of windows (Wise & Wise, 1984).
- People prefer working in buildings with windows (Collins, 1975).
  - 87% expressed dissatisfaction with the lack of windows (Ruys, 1970).
- No evidence of work performance without windows.
  - Windows as a source of distraction and removing them as benefiting the educational process (Chambers, 1963, Tikkannen, 1970).
- Factors to consider
  - The size of windowless space
  - The level of activity within the space
  - and people’s expectations all mediate attitudes toward such environments.

Office furnishings

- Interpersonal aspects of office furnishing:
  - People tend to feel feelings of spaciousness being greeted in offices that are moderately furnished, as contrasted with those that are more empty or over-furnished (Manning, 1965).
  - People react more favorably to offices that have living things (e.g. plants) and aesthetic objects (e.g. posters) and are tidy than to those that lack these features (Campbell, 1979).
  - Example: see Table 15-6, p. 496.
  - These features make visitors feel more comfortable.

Arrangement of Chairs

- Arrangement of chairs for visitors:
  - Influences the reaction of visitors and interpersonal relationships.
  - Friendliness when both chairs are on the same side of the desk
  - Example: see Figure 15-2a, p.496

Human factors aspect of Dwelling Units

- The usage of rooms
- Room arrangement
- Interior design features
  - Ceiling height and slope
  - Windows
  - Color
- Special purpose dwellings
  - College dormitories
  - Housing for the handicapped and elderly
- Beyond the dwelling unit

Room Usage in Dwellings

- The usage of rooms (one human factor aspects)
  - Including indices of the spatial adequacy of dwelling units in relation to the number of occupants.
- Index (two ways)
  - PPR: Index of spatial adequacy is the number of person per room (PPR)
    - It is simply the total number of occupants divided by the number of rooms.
    - The upper limits of what are considered acceptable values of PPR are around 1.00 or 1.20, with a national average of about 0.69 (Black, 1968).
  - SFPP: Index of Square feet per person
    - No standard for the SFPP.
Room Usage in Dwellings

- Study based on "how rooms in a dwelling are used"
- Example: The survey of households in Switzerland (Bachtold, 1964)
- Use made of kitchens (as a function of their size) in relation to their size, given as percentage of house participating in survey.
- The larger the kitchen, the more likely the meals would be eaten there and the children would play there.
- Such data on room usage can be valuable for designing a dwelling to be more useful to the occupants.

Room Arrangement

- Becker (1974) study of room arrangements of the living-dining-eating spaces:
  - Survey by Becker (1974) of apartment occupants of public housing developments included data obtained by interviews with 257 residents and questionnaire checklist from 591 residents.
  - Many variations of room size and arrangement were considered to be equally satisfactory by the residents.
  - But, satisfaction tended to be greater with larger rooms.
  - More residents preferred a separate dining area (39%) or separate dining area and large eat-in kitchen (28%) to combined living-dining area (19%) or living room with large eat-in kitchen (18%).

Room Arrangement (Grandjean, 1973)

- Grandjean (1973) guidelines for the placement of bedrooms within a dwelling:
  - Bedrooms should be separated from the living part of the dwelling (e.g. living room, dining room, kitchen)
  - Bedrooms should be near a bathroom.
  - Bathrooms should be accessible from children’s room without having to pass through the living room.
  - To make it easier to watch small children, at least one child’s bedroom should be close to that of the parents.
  - Because the parent’s bedroom is used so little during the day, it may face north.
  - Since children’s rooms are used so much in the daytime, they should face south.

Interior Design Features

- Ceiling height and slope
  - The usual height for rooms in dwelling units is 8'
  - Study of ceiling height relation to activity (Baird, Cassidy, and Kurr, 1978)
  - The ceiling was set at a given height and asked to give a preference rating on a scale ranging from -10 to +10.
  - Two hypothetical frames of reference:
    - One for dining (activity) vs. No activity
  - The preferred heights were about 2 ft above the conventional height.
  - Subjects prefer sloping ceiling and wall corners that were greater than 90 degree.

- Windows in human factors
  - Kaye & Murray (1982)’s study:
    - Asked 176 students to rate watercolor perspective drawings of a living room on 30 adjectives (e.g., gloomy, pleasant, inviting, colorful, cluttered, confined, and cozy)
    - Used factor analysis
    - Identified 4 underlying factors that underlie ratings for various room arrangements using an adjective rating form (See Table 15-9).
    - With windows: more friendly, inviting, and exciting (social-aesthetic).
    - No windows: gloomy, and closed (mood) and more spacious (Size).
Interior Design Features

- **Color in human factors**
  - People differ in their preferences for color.
  - Combinations of colors in rooms and furnishings are based on subjective preferences.
  - Bennett (1977) study found:
    - People prefer light to dark colors.
    - Saturated colors to unsaturated colors.
    - When objects are placed against a background, people prefer high-contrast combinations (e.g., light-colored objects with dark background colors).
  - Kunishima & Yannase (1985) experiment study:
    - Experiment: Subjects color slides (60 slides) of empty living rooms with different wall colors. Subjects rated each room on 16 bipolar-adjective scales (e.g., spacious-crowded, calm-restless).
    - Used factor analysis.
    - Factors were found: activity; evaluation and warmth.
    - Hue had its greatest effect on the warmth factor with reds rated high, greens neutral, and blues low.
    - Saturation affected the evaluation factor and to a lesser degree the activity factor.
    - As saturation increased, the rating on the evaluation factor decreased sharply while the rating on the activity factor increased.

- **Color: The relationship between hue and perceived warmth**
  - Greene & Bell (1980) study:
    - Assessed whether different colors actually affected people’s perception of thermal comfort.
    - No actual differences:
      - e.g., room painted red or blue, resulted in the same degree of thermal comfort.
  - **The influence of color in our lives**:
    - Scylla:
      - accepting the many common beliefs and pronouncements about the effects of color.
    - Charybdis:
      - rejecting such beliefs and notions, assuming that color is of only nominal consequence in human life.

Special-purpose dwellings

- **College dormitories**
  - An example of how the design of buildings can influence the social behavior of people.
  - Effects of dormitory design on social behavior.
    - Baum & Valins (1977) study:
      - Compared residents of suite-type and corridor-type dormitories in terms of the residential locations of their friends.
      - Results: More of the friends of residents of suite-type dormitories lived within the same dormitory (61%) as contrasted with friends of residents of corridor-type (27%).
      - Suite-type dormitories are more conducive to the formation of friendships.
  - Residents of long vs. short corridors
    - Those living on short corridors had a sense of greater privacy, less aggressiveness than did those living on long corridors.

Beyond the dwelling unit in human factors

- **Multifamily housing developments**
  - involve human factors consideration.
  - Factors are associated with features:
    - Height, size, and arrangement of apartment buildings, and outdoor features.
    - Becker (1974) study of housing developments in urban and suburban areas throughout NY state.
      - Exterior appearance was “very important” to most residents (67%).
      - Variations in the shape, pattern, and form of building that increase their individuality were much appreciated.
      - Straight, rectilinear, and symmetric forms were strongly disliked.

Beyond the dwelling unit in human factors

- **Housing for the handicapped and elderly**
  - The population:
    - Almost 1% of the U.S. population will be 65 years old or older and 40% of the elderly population will be 75 years of age or older in 2010 (Newman, Zale, and Shyuk, 1984).
  - Circumstances include:
    - Physical limitations and health conditions:
      - Difficulty in interpreting information
      - Loss of sight/loss of hearing
      - Lack of balance/Loss of upper extremity skills/Inability to use lower extremities
      - Limited stamina
      - Difficulty in moving the head
      - Difficulty bending, kneeling, etc.
      - Restricted their activities
      - They spend more time in their housing units.
      - The additional cost constraints.

Special-purpose dwellings

- **Housing for the handicapped and elderly**
  - The barrier around a development can influence the affective response to the development (see Figure 15-6, p. 505).
    - Wire fence gives an institutional impression.
    - Hedge-like fence creates a psychological boundary and feeling of enclosure.
Beyond the dwelling unit in human factors

- Human factors of urban communities
  - The population growth makes it inevitable that many people must live in close proximity to others
  - The existence of urban centers.
  - By proper design, urban centers can be created which make it possible to achieve the fulfillment of a wide spectrum of reasonable human values (Sanders, 1993).
  - Cities are not just social, political, economic, and cultural systems, but geographical and physical systems as well (Proshansky, Ittelson & Rivlin, 1976).
  - The interaction of various features of cities influences the quality of life.
  - The crowding and density in slum areas or spacious apartments or in posh suburban areas.

Challenge designing living space

- Living space
  - Human beings’ living space in the buildings and other structures they use and in the communities they build.
  - Perfection in built environment is not realistic.
    - Not easy to provide for the broad-scale fulfillment of the various criteria relevant to:
      - physical and mental health and welfare, aesthetic values, opportunity for social interchange or privacy, recreation, entertainment, culture, convenience, mobility, safety, and security, and more…
  - Newly constructed components (buildings, cities, etc.) are designed to be reasonably optimum in terms of fulfilling human needs.

Discussion

Final project
Due: 08/06/2009